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Case Report

Bilateral primary total knee arthroplasty using revision implants due to severe varus deformity to achieve maximum functional outcome, was it worth it?

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Abstract We report a case of 66 years old man with sever osteoarthritis (OA) in both knees with severe varus deformity. Patient was treated with bilateral total knee arthroplasty (TKA) simultaneously with wedge augmentation of medial tibial plateau depression of both knees to restore the weight bearing axis of lower limbs. Although the recent trend and countless studies indicates the effectiveness of unilateral TKA and not to address both knees at the same time, this patient was operated same day keeping in mind the challenging surgery of primary bilateral TKA using revision armamentum, and all the possible complications of a lengthy surgery, but the rational was to provide rehabilitation simultaneously to both knees and to maximize the functional outcome of the surgery. Patient was functionally scored prior and post-surgery using international knee score. We report excellent outcome of the procedure using the full potential of a rehabilitation facility.

Introduction

Currently, the lifetime risk of developing symptomatic knee osteoarthritis (OA) is approximately 50%.[1] Knee OA is a leading cause of disability in persons in the developed countries and this is only projected to increase with an ageing and overweight population.[2] Pain is the leading symptom of OA and is often chronic in nature, leading to significant morbidity and decreased quality of life.[3] Knee osteoarthritis commonly requires joint replacement, substantially reduces quality of life and increases healthcare utilization and costs.[4] The safety of simultaneous bilateral total knee replacement remains controversial. Some studies have demonstrated a higher rate of serious complications, including death, following bilateral procedures, whereas others have suggested no increase in the complication rate.[5,6] However, the systematic differences in

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Figure 1: Preoperative knee AP and lateral X-rays.

patient gender, hospital and surgeon volume, and geographic region between those who undergo simultaneous total knee replacements.[7] As the literature is mostly covering the western world, the situation is quite different in the Arab countries where multiple factors influence the patients' decision to get definitive treatment. In this case report we represents a patient as a model for further studies, with sever OA in both knees with sever varus deformity and treated by TKA.

Case report

A 66-year-old Saudi male patient presented to our institution with complaints of pain in both knee joints with severe disability for the last 10 years. The patient explained that he had a persistent difficulty during daily activities; the most important concern for him was that he cannot pray normally on the floor. He was feeling better with rest. He was able to walk only for short distances and has great difficulties with climbing of the stairs. A review of his medical history indicated that the patient had been under medication for diabetes mellitus and hyperlipdemia for the past 15 years. The rest of the patient's medical history was unremarkable, and the patient appeared to be in good health.

Patient was Ambulant with a limp, he had popliteal angle of 10 degrees on both knees, with ROM of 10–135 Degrees on both sides. Power of muscles was + 3/5 on both lower limbs in all muscle groups. X-ray revealed bilateral end stage Knee osteoarthritis (OA) in both knees with depression of the medial tibial pleatue almost 20 mm (Figures 1–3). Patient was offered bilateral knee arthroplasty, which he was agreed and bilateral knee arthroplasty was done. Both knees underwent primary knee arthroplasty, but due to the neglected deformity, they were augmented with wedges on the medial side of the tibial tray and reinforced with Intra-medullary stems on the tibial side only (Figures 4 and 5).

Patient had no postoperative complications and he was put on international knee rehabilitation protocol. Patient did very well and on 14th postoperative day he was able to take steps on ladder and fully independent in his routine including going to toilet and walking. His range-of-motion (ROM) was 0–125 degrees actively in the initial postoperative period and he regained his ROM more in the latter rehabilitation period (Figure 6).

Patient was scored by the international knee score preoperative and postoperative and the results were striking. His overall score preoperatively was 50 and functional score was 5 which was improved postoperatively to 95 and functional score was improved to 70 in 3 months of time. Patient continued rehabilitation as an outpatient and he progressed rapidly, and in the 6 months period he was ambulating fully and

Figure 2: Preoperative long films.

independently without a cane and absolutely pain free, and he was praying on the chair without any aid. The patient was followed for 2 years and he continued to progress in his better lifestyle due to successful surgery.

Discussion

In the last few years trend has been changed of doing bilateral knee arthroplasty as many authors demonstrated a higher rate of serious complications following bilateral procedures, whereas others have suggested no increase in the complication rate.[5,6] Nevertheless, at the same time literature is also supporting bilateral knee artroplasty, with its unique advantages in terms of reduced pain in both knees and increased function as there is rehabilitation for both knees simultaneously if the patient is fit enough to tolerate this surgery.[6] As the literature is mostly covering the Western world, the situation is quite different in the Arab countries where cultural social, religious, and multiple other factors influence the patients decision to get definitive treatment regarding knee OA, and the result is seen frequently as very challenging knee deformities which are uncommon in the west due to early referral and early treatment.[8,9]

Patients' knees due to OA not so frequently develop severe varus deformities bilaterally, with loss of bone stock on the medial aspect of the tibial pleatue resulting on more varus deformities and severe ligamentous instabilities on lateral side on coronal planes.[10] These deformities are not easy to address and it needs careful preoperative planning and expertise to handle these issues. This is to emphasize on that we used revision implants only on the tibial side, and almost never we used augmentation on the femoral side as tibial pleatue is always more damaged than the femoral condyles and this is due to multiple social and cultural factors as kneeling, squatting, floor sitting and socialization issues. Patients usually lose a lot of muscle power secondary to pain and instability and usually they are in the viscous circle of pain and disuse atrophy.[11]

Figure 3: Preoperative picture showing varus deformity at the knees.

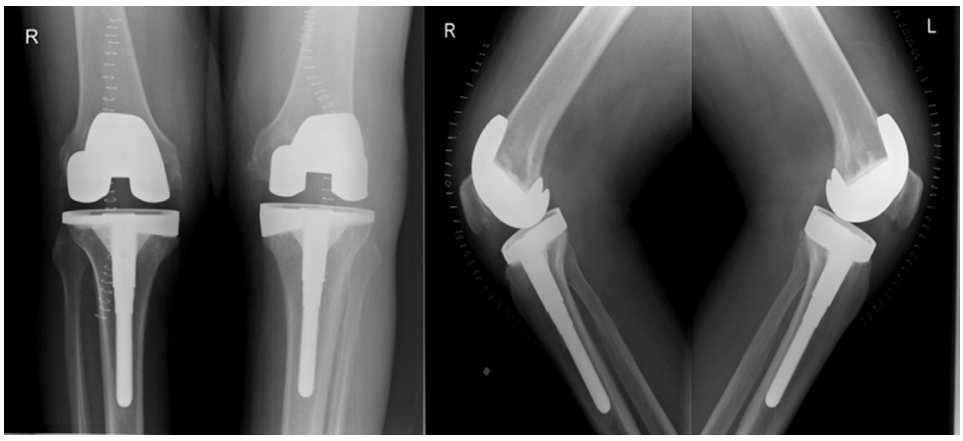

Figure 4: Postoperative X-rays with medial tibial augmentation and stems in tibia.

In our patient we gave him the option of bilateral Total knee arthroplasty, as he was generally fit and he could sustain the surgery. He was highly motivated and the deformity was of such extent that he could not get benefit of unilateral knee arthroplasty. Bilateral knee arthroplasty was done and significant functional improvements were obtained. A recent study reported that rehabilitation protocols should be made for preoperative, early postoperative and late postoperative stages of bilateral knee arthroplasty.[12] This patient continued rehabilitation as an outpatient and he progressed rapidly and in the 6 months period he was ambulating fully and independently without cane and absolutely pain free. The patient was followed for 2 years and he continued his better life style due to successful surgery. Studies also reported that patient treated with bilateral TKA significantly increase the functional outcome and leading healthier lifestyle.[13,14]

The Saudi population is frequently presenting with severe deformities due to medial bone loss in tibia and due to that, they are not good ambulators and they have instability in their knees, and if we perform unilateral knee artroplasty due to the deformity and the weak quadriceps on the non-operative side. It is very difficult to ambulate them, as they still have another painful unstable and shorter knee and the operated knee will be straight, stable and longer and all deformities will be corrected (Figure 7). The issues in the non-operative knee will affect the rehabilitation of the operated side also. For these patients, if we perform bilateral knee arthroplasty at the same setting, it has been observed that it's relatively easy to ambulate them, if pain has been controlled properly the rehabilitation is also relatively easy and beneficial for them as both knees are being rehabilitated at the same time. These patients due to several factors which cloud their decision of taking medical treatment for their problem, usually declines the surgery for the non-operated side usually due to the fear of pain and continuous labour of rehabilitation.[15,16] But these problems can be sorted out by proper counselling. It has been observed in a few instances, that the patients have refused surgery for the other knee. These patients as they are usually presenting late and they have co-morbidities also, so repeated anaesthesia is also an issue, so if they are optimized preoperatively, bilateral knee artroplasty is a good option for these patients as it will save them from repeated anaesthesia's.[16]

Figure 5: Postoperative long films showing restoration of mechanical and anatomical alignment.

Figure 6: Postoperative picture showing correction of varus deformity in both knees.

Figure 7: Correction of a varus deformity in a single knee (model).

Conclusion

In conclusion, bilateral total knee arthroplasty can be a very beneficial procedure, especially the difficult and very advanced arthritic knees with bone stock loss. If the patient has been selected properly on the grounds of his general condition, experienced surgical and anaesthetic techniques, and if this procedure is combined with proper rehabilitation. Excellent functional out comes can be achieved by rehabilitating both knees at the same time.

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